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# United States Patent [19]

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Tupa et al.

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[54] **METHOD OF ATTACHING A FACEPLATE ASSEMBLY TO AN APPLIANCE**

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[57] **ABSTRACT**

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A control panel assembly for a domestic appliance providing an improved assembly which insures uniform and proper alignment of control instruments mounted therein. The control panel assembly includes a control panel faceplate, a control instrument mounting bracket, and a bracket retainer. The faceplate includes an indexing or positioning notch into which the mounting bracket, which has the control instruments mounted thereto, fits to correctly locate the control instruments relative to openings in the faceplate. The bracket retainer attaches the mounting bracket to the control panel faceplate. The control panel faceplate, with the mounting bracket and bracket retainer mounted thereon, is slidably and removably attached to a trim wrapper and deflector provided by the control panel. The present invention improves upon control panels known in the art which do not index or relate the control instruments or mounting bracket to the faceplate, and which do not allow access to the control instruments from a front of the control panel.

**Related U.S. Application Data**

[62] Division of Ser. No. 32,130, Mar. 17, 1993, Pat. No. 5,375,921.

[51] Int. Cl.<sup>6</sup> ..... **B23P 11/02**

[52] U.S. Cl. .... **29/525.1**

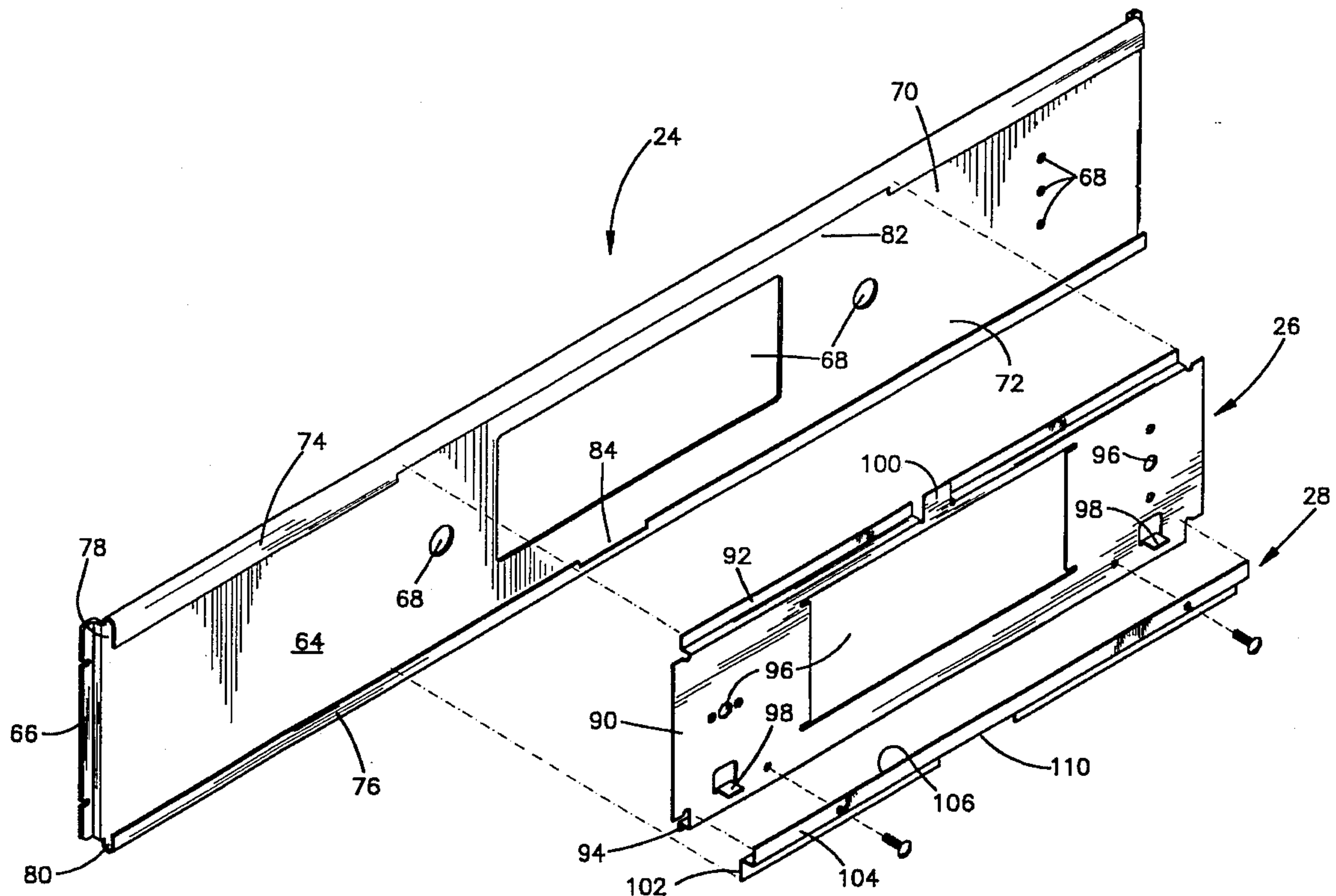
[58] Field of Search ..... 29/525.1; 312/223.1, 312/236, 257.1, 265.5, 265.6, 279; 220/4.02

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**11 Claims, 6 Drawing Sheets**



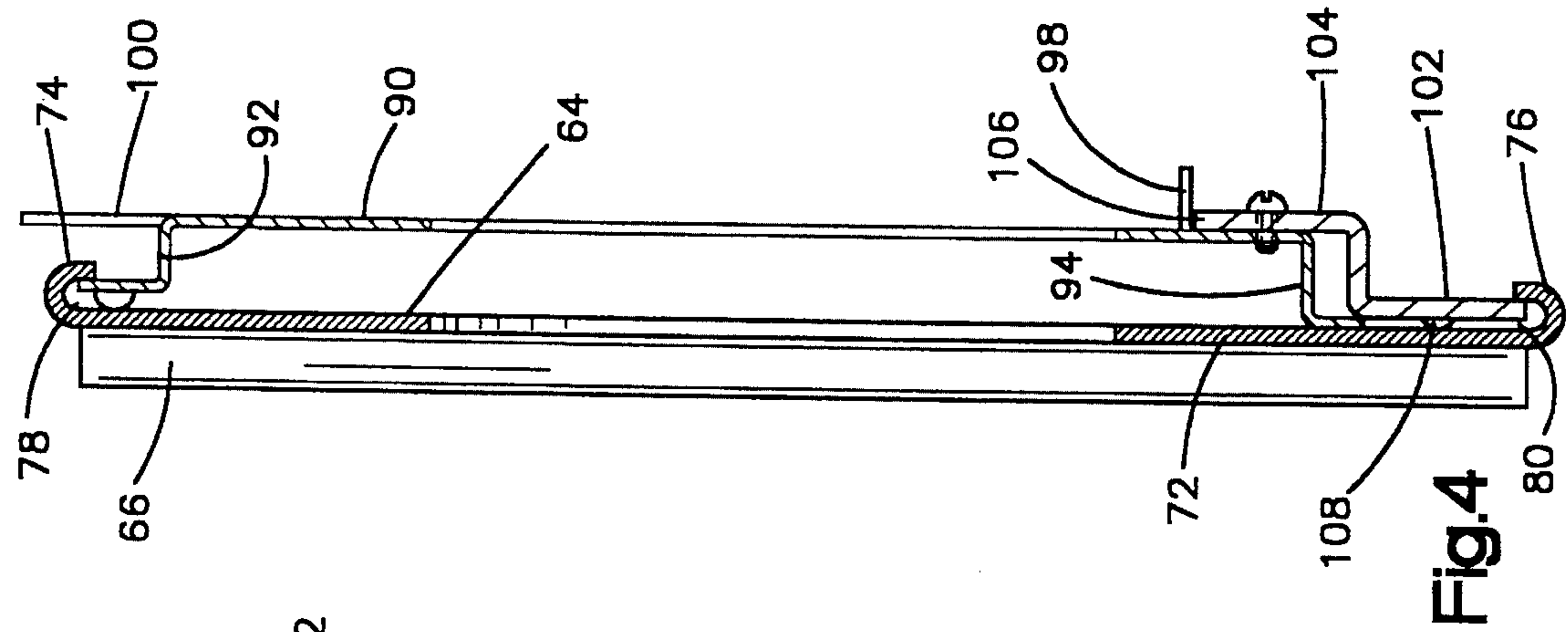


Fig. 4

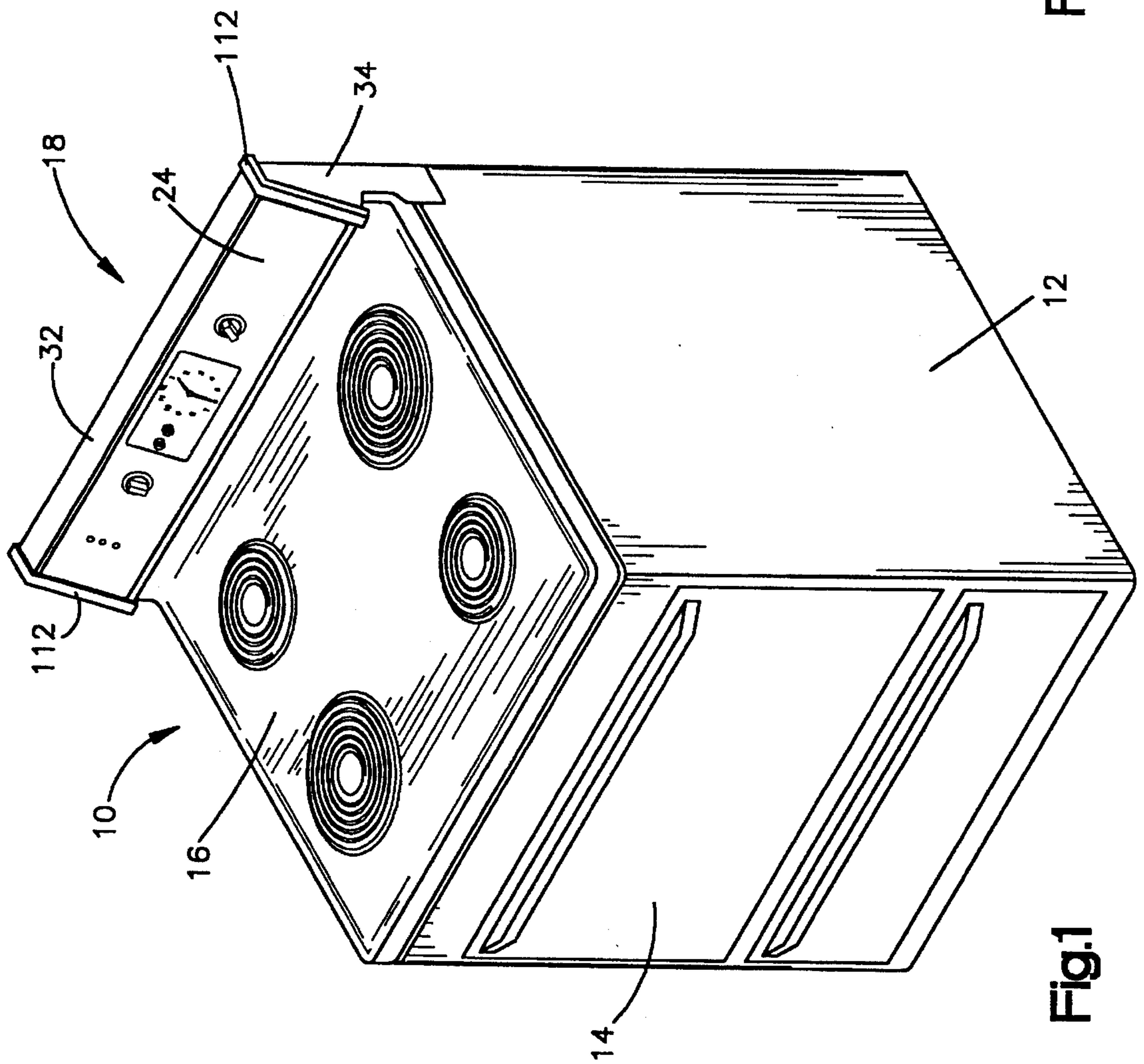


Fig. 1

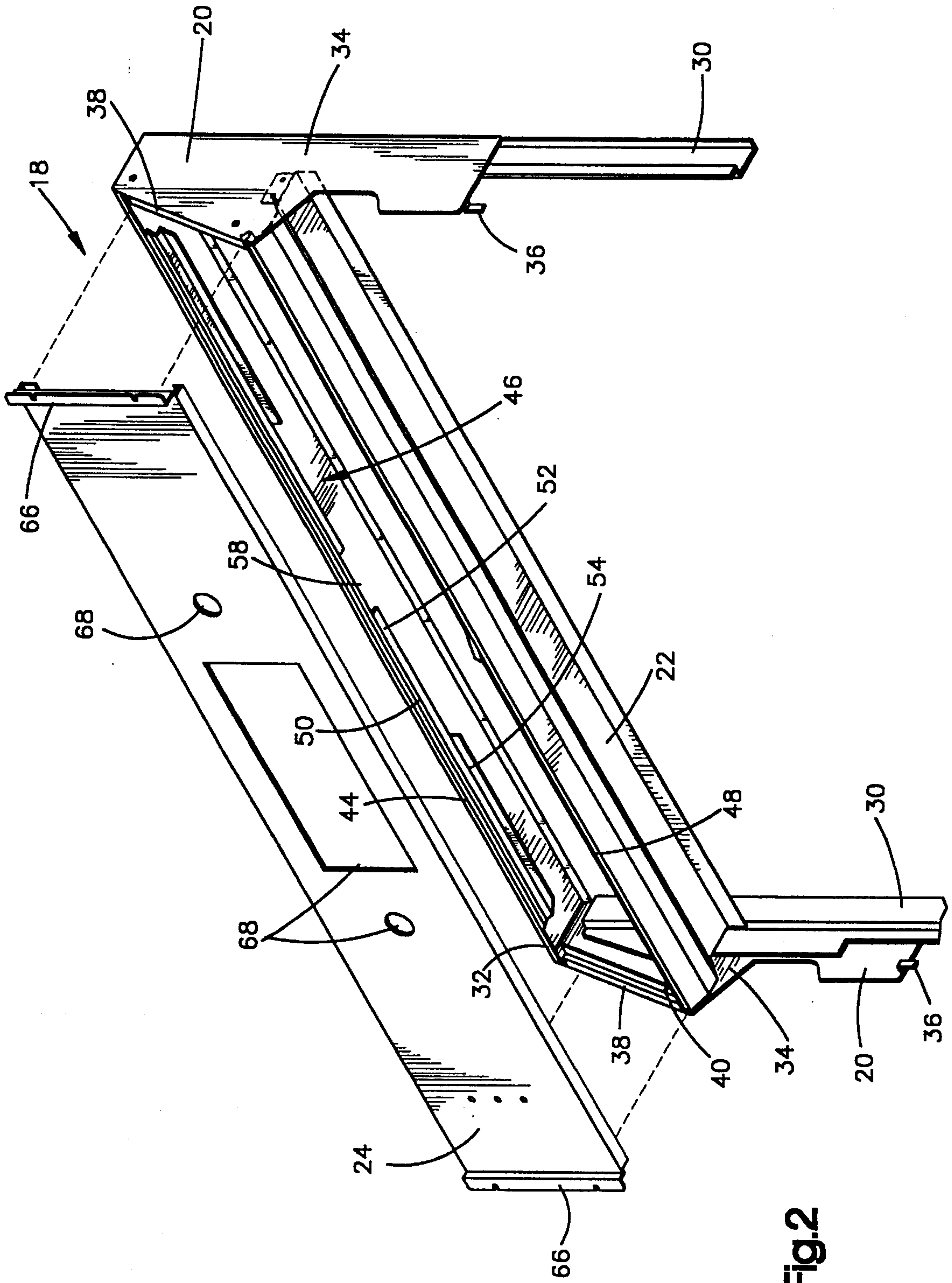


Fig.2



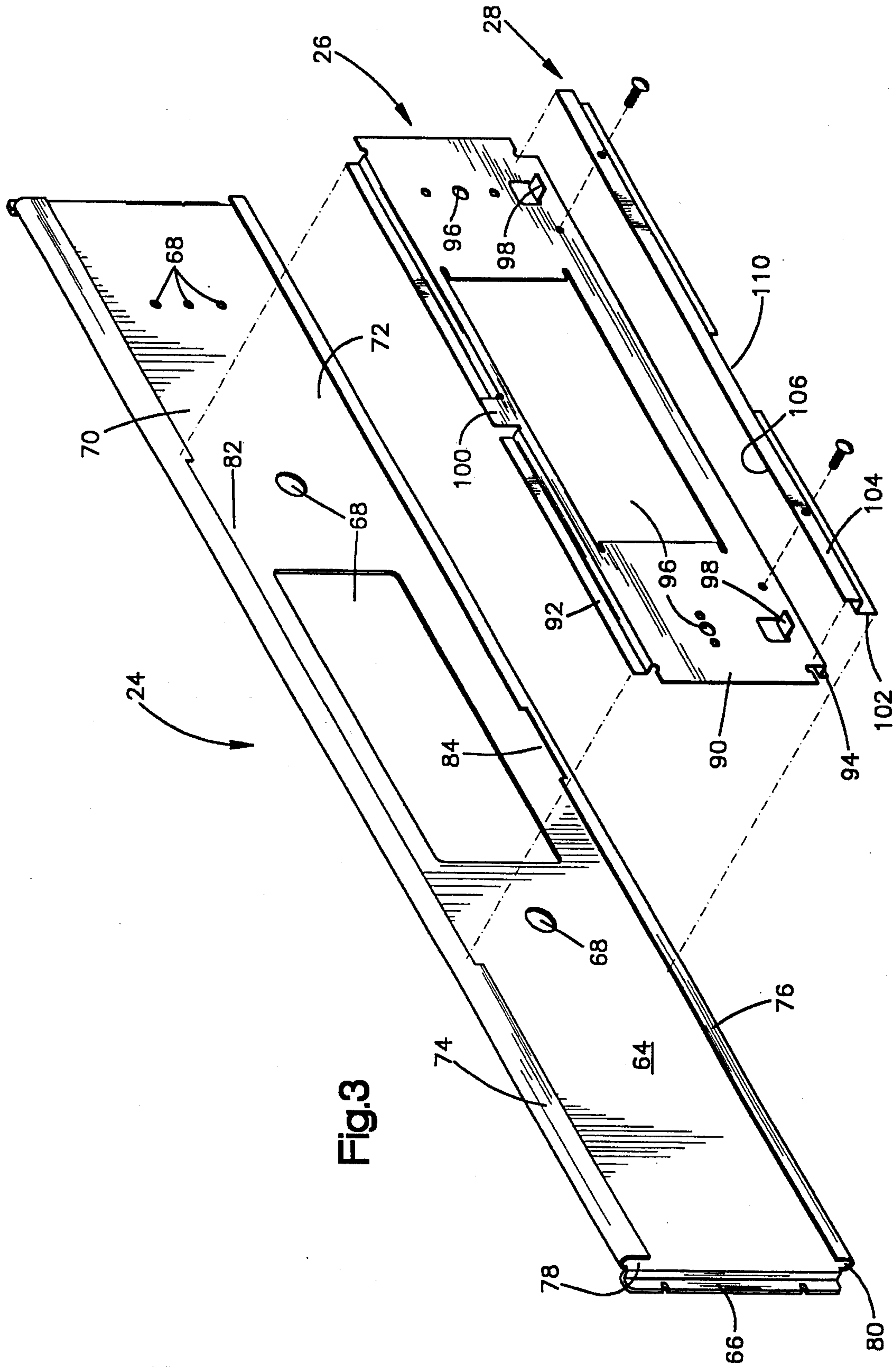


Fig.3

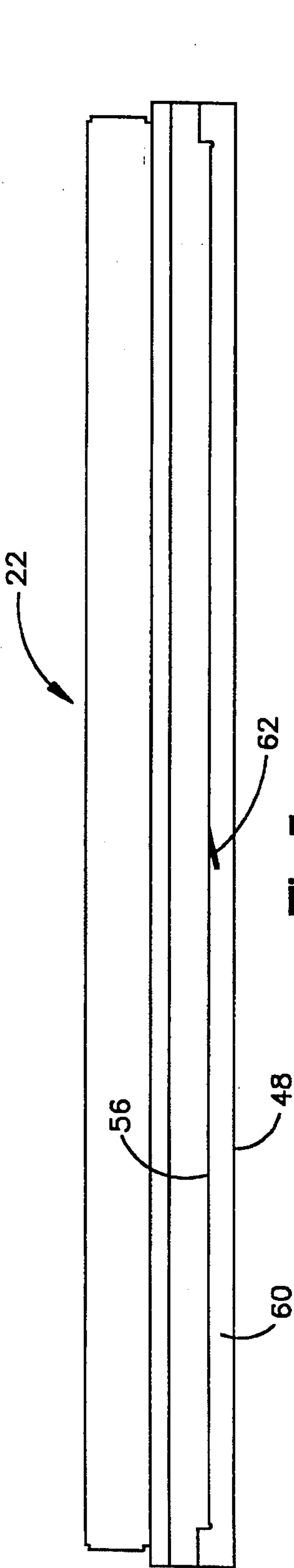


Fig. 5

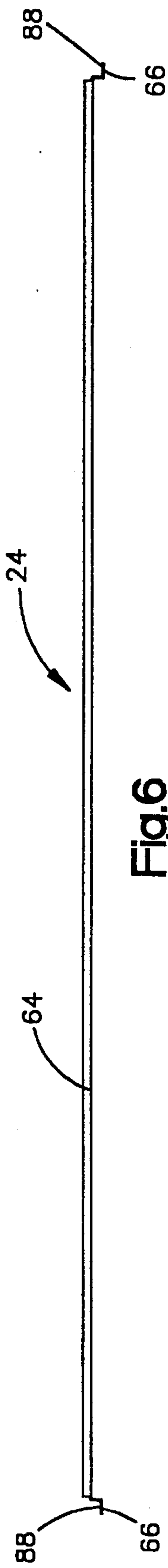


Fig. 6

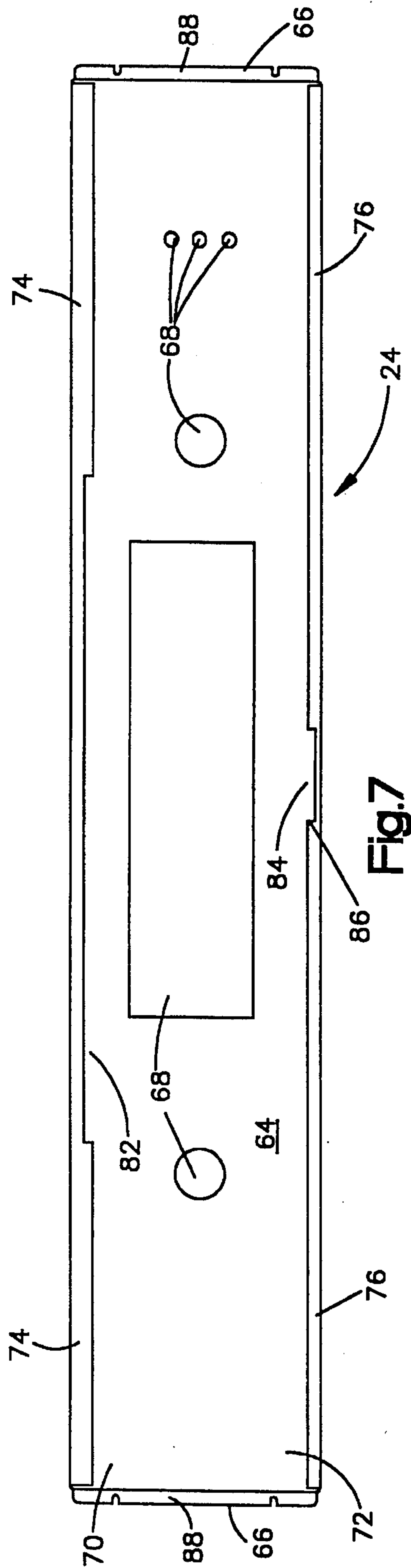


Fig. 7

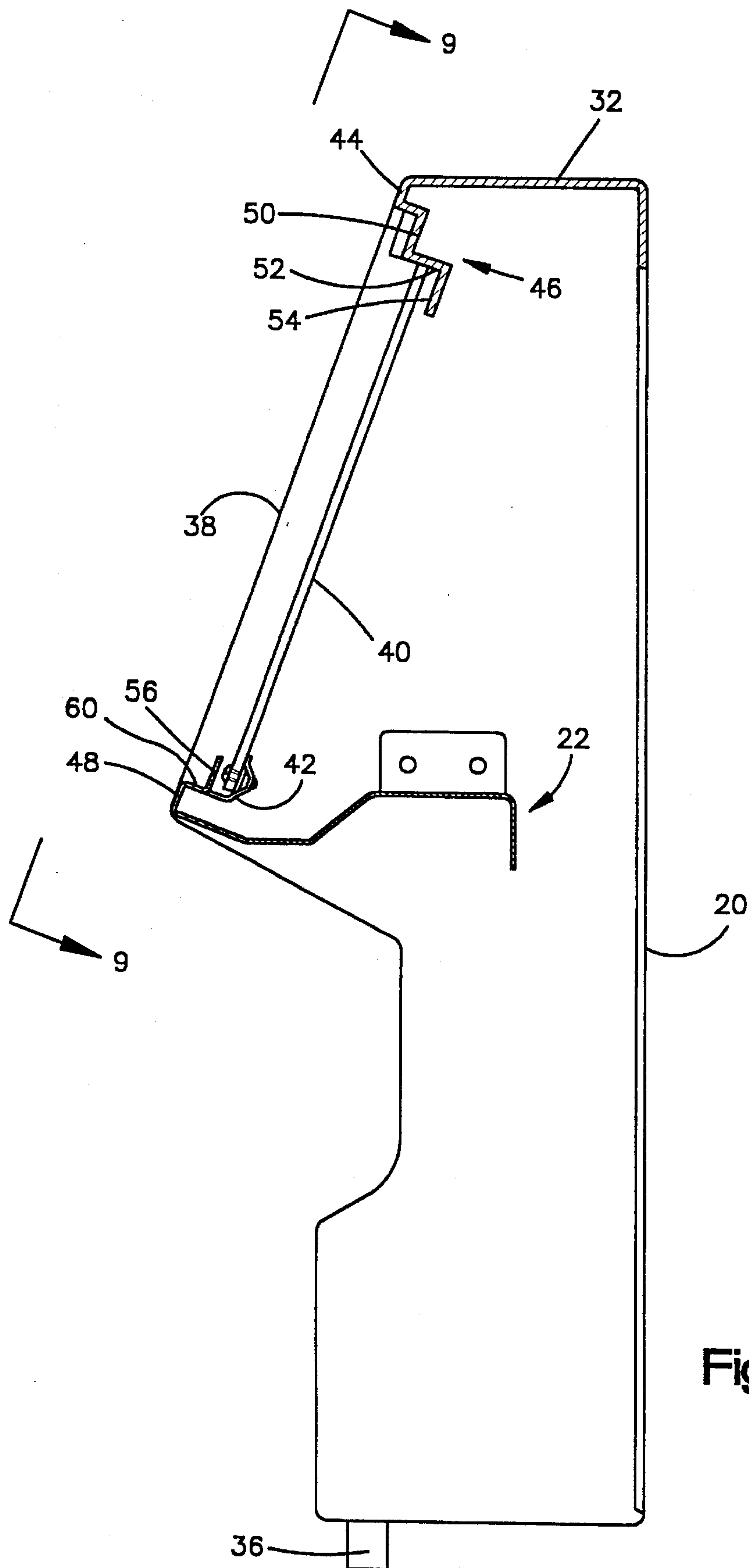


Fig.8

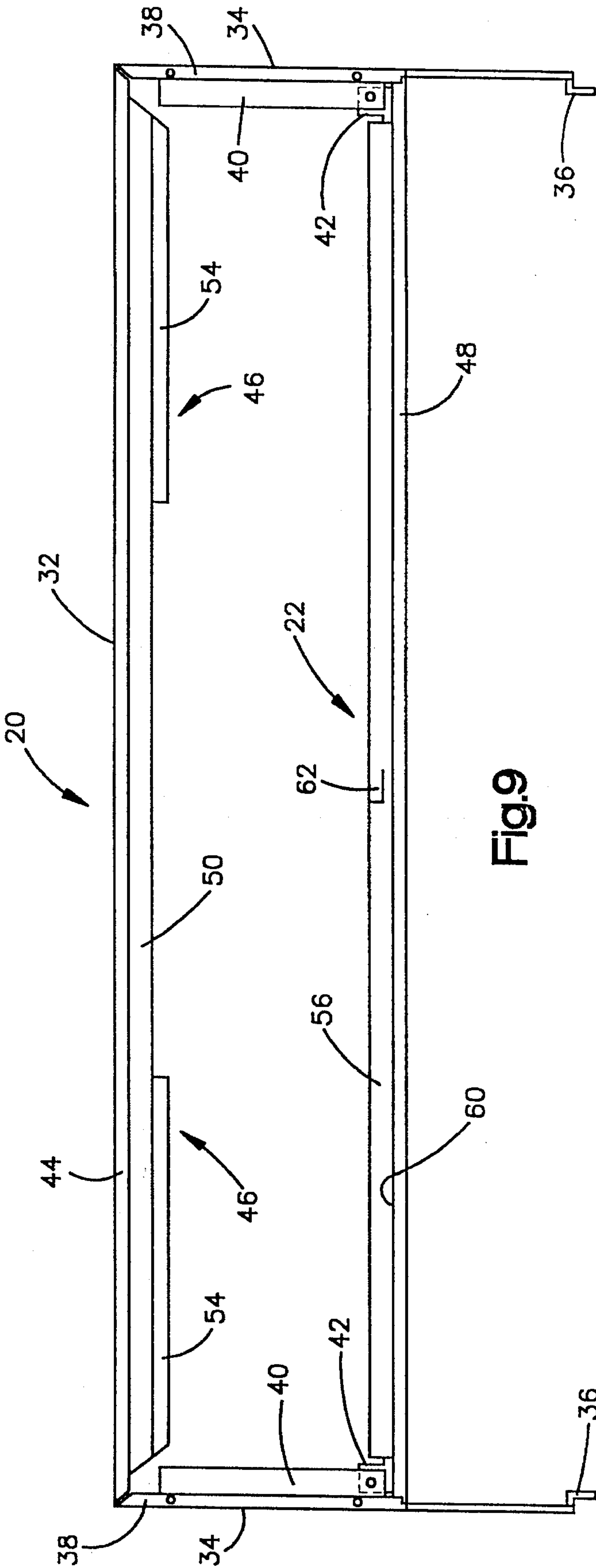


Fig.9

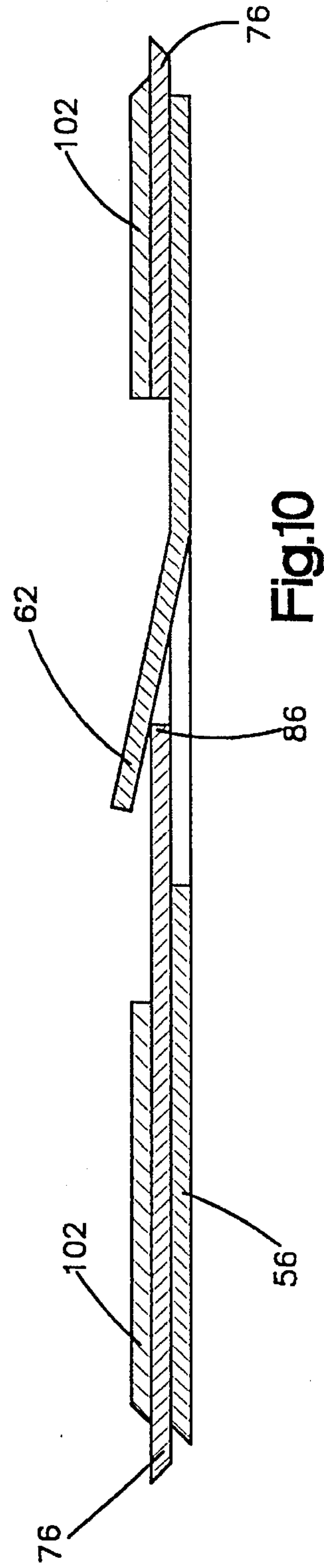


Fig.10



## METHOD OF ATTACHING A FACEPLATE ASSEMBLY TO AN APPLIANCE

This is a division of application Ser. No. 08/032,130, filed Mar. 17, 1993, now U.S. Pat. No. 5,385,421.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates generally to domestic appliances and, more particularly, to an improved control panel assembly for use in such appliances.

#### 2. Description of the Related Art

Domestic appliances typically include a control panel which extends upwardly from a rear or back upper surface of an appliance cabinet. The control panel includes a faceplate which provides apertures through which extend shafts or stems of various rotary or push-button control instruments. These shafts or stems usually have snap fit thereon a control knob or pushbutton cap which is engaged by the user to actuate or adjust the control instrument and thereby control the operation of the appliance.

It is important from an aesthetic point of view that the control instruments consistently align with the faceplate apertures so that the resulting appliances have an attractive and uniform appearance. However, during development of control panels, alignment of the control instruments with the faceplate apertures has been problematic.

In one known prior art domestic appliance, an instrument mounting plate is provided beneath the control panel faceplate and serves as a base or support for control instruments which are mounted thereto. The mounting plate extends the entire width of the control panel and is attached at opposite ends to a control panel trim wrapper which underlies the faceplate and forms the exterior top and lateral sides of the control panel. After the mounting plate, including the control instruments mounted thereto, is attached to the panel trim wrapper, the control panel faceplate is placed over the mounting plate such that the stems or shafts provided by the control instruments extend through the faceplate openings.

The aforementioned prior art control panel assemblies suffers from several deficiencies or shortcomings which limit or reduce its desirability. For example, the prior art control panel assembly is dependent upon the faceplate and instrument mounting plate being exactly manufactured. Otherwise, the control instrument shafts will not perfectly align with the center of the holes in the faceplate. Since there is no direct physical relationship or connection between the mounting plate and the control panel faceplate, and due to machining tolerances and imperfections, the shafts have a tendency to not align with the center of the faceplate apertures, resulting in a nonuniform and sloppy appearance. Moreover, with an assembly of the aforementioned type, the control appliances or devices are only accessible via the rear of the appliance, increasing the time and labor required to repair or replace the control instruments.

Therefore, there exists a need in the art for an improved control panel assembly which positively indexes or locates the control instruments relative to the control panel faceplate such that alignment between the control instruments and the apertures in the faceplate is assured. Moreover, there exists a need in the art for an assembly of the aforementioned type wherein the control instruments are accessible from a front of the appliance.

### SUMMARY OF THE INVENTION

The present invention provides an appliance control panel wherein the control instruments are indexed relative to the

control panel faceplate to properly align with apertures provided thereby. The present invention also provides a control panel assembly wherein the control instruments housed therein are accessible for replacement or repair from a front of the control panel or appliance.

In accordance with the present invention the control panel includes a frame or support member, a faceplate, a mounting bracket, and mounting bracket retainer means. The frame member underlies and supports the faceplate. The mounting bracket is removably attached to a rear or inner surface of the faceplate by the mounting bracket retainer means.

In further accordance with the present invention, the faceplate includes a generally planar main body, a pair of lengthwise-directed rails, locating means, and first mounting means. The main body defines a series of openings through which the control instruments extend or are visible. The first mounting means mount a portion of the faceplate to the frame member, while the locating means are operable to properly position the mounting bracket relative to the faceplate.

In accordance with the present invention, the mounting bracket provides a planar main section, a pair of lengthwise directed legs, and second mounting means. The pair of legs engage the main body of the faceplate and space the main section of the mounting bracket therefrom. The second mounting means mounts the bracket to the frame member.

In further accordance with the present invention, a control panel faceplate assembly is adapted to mount to the control panel frame by positioning the faceplate assembly such that a tab extending therefrom projects into a notched opening in the frame, pivoting the faceplate assembly to engage the tab with a rear or inner surface of the frame, and lengthwise sliding the faceplate assembly to engage a portion of the faceplate assembly with an assembly retention means provided by the frame. The faceplate assembly includes the control panel faceplate with the mounting bracket and mounting bracket retainer mounted thereon. The frame comprises a trim wrapper and deflector. The assembly retention means comprises a tang which outwardly extends from the deflector.

### BRIEF DESCRIPTION OF THE DRAWINGS

These and further features of the present invention will be apparent with reference to the following description and drawings, wherein:

FIG. 1 is a perspective view of a domestic appliance incorporating the present invention;

FIG. 2 is a partially exploded front perspective view, as viewed from below, of the control panel faceplate, trim wrapper, and deflector, in accordance with the present invention;

FIG. 3 is a rear exploded perspective view of the control panel faceplate, mounting bracket, and bracket retainer according to the present invention;

FIG. 4 is an elevational view, in cross section, of the assembled control panel faceplate, mounting bracket, and bracket retainer in accordance with the present invention;

FIG. 5 is a top plan view of the trim deflector according to the present invention;

FIG. 6 is a top plan view of the control panel faceplate in accordance with the present invention;

FIG. 7 is a rear elevational view of the control panel faceplate in accordance with the present invention;



FIG. 8 is an end elevational view, partially in cross section, of the trim wrapper and deflector in accordance with the present invention;

FIG. 9 is a front elevational view of the deflector and trim wrapper, as viewed from line 9—9 of FIG. 8; and

FIG. 10 is an enlarged cross sectional view of the engagement of the control panel faceplate and a tang provided by the deflector.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1, a domestic appliance incorporating the present invention is shown. The illustrated appliance 10, in this case a range, provides a generally box-like cabinet 12 having a front access opening which is closed by a pivotally mounted door 14. An upper surface 16 of the cabinet 12 provides a cook top having a series of burners or heating elements, as is conventional. The rear of the cabinet top has a control panel 18 projecting upwardly therefrom.

As shown best in FIGS. 2 and 3, the control panel 18 includes a panel trim wrapper 20, a deflector 22, a control panel faceplate 24, a mounting bracket 26, and a mounting bracket retainer 28. The control panel faceplate 24 has an inner surface to which is mounted the mounting bracket 26 and mounting bracket retainer 28 and an outer surface which forms a portion of the visible front side of the control panel 18.

A pair of upright supports 30 interconnect the control panel 18 and the cabinet 12, or, more specifically, the trim wrapper 20 and the cabinet 12. In the illustrated control panel 18, the upright supports 30 space the control panel from the cook top provided by the upper surface 16 of the cabinet. Naturally, it is contemplated that various means may be employed to attach the control panel to the appliance cabinet. It is also recognized that in some appliances (i.e., clothes washing or drying machines) the control panel will not be spaced from the upper surface of the cabinet and, thus, the upright supports will be reduced in length or eliminated.

As shown best in FIGS. 2, 8, and 9, the trim wrapper 20 provides an upper member 32 and a pair of opposed, vertically-oriented side members 34. The upper member 32 and side members 34 cooperate to define the top and lateral sides of the control panel 18, as illustrated. Preferably, the trim wrapper 20 is painted sheet metal which is bent or otherwise formed into the illustrated configuration.

A lower terminal end of each side member 34 includes inwardly and downwardly directed hooks 36. The hooks extend into slots (not shown) in the cabinet 12 and thereby locate or position the trim wrapper 20 and, hence, the control panel 18, relative to the upper surface 16 of the cabinet. Each of the side members 34 also include a mounting surface 38 and an inwardly projecting flange 40.

The mounting surfaces 38 provided by the side members 34 cooperate to support lateral sides of the control panel faceplate 24, as will be clear from the description to follow. Each of the mounting surfaces 38 also provide or define holes which facilitate the mechanical attachment of the control panel faceplate 24 thereto. The inwardly-projecting flanges 40 provided by the side members each attach to a like flange 42 provided by the deflector 22 to define and unify a frame or support member which underlies the control panel faceplate 24, as illustrated in FIG. 2.

With continued reference to FIGS. 2, 8, and 9, the upper member 32 of the trim wrapper 20 includes a front surface

44 and an inwardly and rearwardly-directed stepped flange 46. The front surface 44 cooperates with the outer surface of the control panel faceplate 24 and a like front surface 48 provided by the deflector 22 to define a forwardly-directed or front side of the control panel 18. Relatively inward from the front surface 44, the stepped flange 46 provides a support surface 50, a mounting surface 52, and a terminal surface 54. As will be discussed more fully hereafter, the support surface 50 cooperates with a like support surface 56 provided by the deflector 22 to support upper and lower portions of the control panel faceplate 24.

The mounting surface 52 provided by the stepped flange 46 defines a tab-receiving notch 58 (FIG. 2) to facilitate mounting and retention of the mounting bracket 26 and control panel faceplate 24 thereto. Preferably, the notch 58 is slightly offset from the center of the mounting surface 52 to facilitate receipt of a tab thereby, as will be described hereafter. The terminal surface 54 has a middle section thereof cut away to allow a tab to be inserted into the tab-receiving notch 58 of the mounting surface 52. The deflector 22 is attached between and interconnects the upright supports 30 and the trim wrapper side members 34. Hence, the deflector 22 and panel trim wrapper 20 cooperate to define a box-like frame or support member for the control panel 18 which provides a stable base for mounting of the control panel faceplate 24 and associated control instruments thereto.

As discussed previously, the front surface 48 of the deflector 22 defines a portion of the forward or front side of the control panel 18. A generally L-shaped flange extends inwardly or rearwardly from the front surface 48. The L-shaped flange includes the support surface 56, which is generally co-planar with the support surface 50 provided by the trim wrapper upper member 32, and an inwardly extending portion 60, which is perpendicular to the front surface 48.

As shown best in FIGS. 2 and 9, the deflector support surface 56 is cut or separated at a location generally midway along its length to provide a tang 62 which is outwardly bent therefrom. The tang 62 is engaged by and removably retains a portion of the control panel faceplate 24. As will be described more fully hereafter, the support surfaces 50, 56, tab-receiving notch 58, and tang 62 cooperate to removably mount the control panel faceplate 24 to the panel trim wrapper 20 and deflector 22.

The control panel faceplate 24 defines a generally planar main body 64 and a pair of lateral mounting ears 66. As shown best in FIGS. 3 and 7, the main body 64 provides a series of openings 68 through which the control instruments extend or are visible. Upper and lower portions 70, 72 of the main body 64 are bent or rounded over to form upper and lower lengthwise-extending support rails 74, 76. The upper and lower support rails 74, 76 define upper and lower longitudinal channels 78, 80, respectively. Preferably, and as illustrated, the upper channel 78 is relatively deeper than the lower channel 80.

The upper support rail 74 provides a notched recess 82 into which is fit the mounting bracket 26. The notched recess 82 serves as a locating or positioning means to ensure that the mounting bracket 26 is properly positioned with respect to the control panel faceplate 24. The lower support rail 76 provides a notched recess 84, one side or edge 86 of which is adapted to engage the tang 62 provided by the deflector 22 to mount the lower portion 72 of the main body 64 of the control panel faceplate 24 thereto.

Each of the lateral mounting ears 66 provide an attach-



ment surface **88** which is parallel to but outwardly-spaced from the faceplate main body **64**. The attachment surface **88** includes a pair of generally U-shaped openings which are adapted to receive or surround a conventional mechanical fastener such as a screw, bolt, or the like. The fasteners removably attach the attachment surfaces **88** to the mounting surfaces **38** provided by the side members **34**.

When the attachment and mounting surfaces **88, 38** are in engagement, the upper and lower support rails **74, 76** of the control panel faceplate **24** engage the support surfaces **50, 56** provided by the trim wrapper upper member **32** and the deflector **22**, respectively. The front surfaces **44, 48** of the upper member **32** and deflector **22** are generally co-planar and cooperate with the outer surface of the control panel faceplate **24** to define the front side of the control panel **18**.

The mounting bracket **26** has a generally planar main section **90** and upper and lower lengthwise-directed supporting legs **92, 94**. The supporting legs **92, 94**, which are generally L-shaped in cross section, maintain the main section **90** of the mounting bracket **26** a short distance from the faceplate main body **64**, as shown best in FIG. 4.

The main section **90** includes a series of mounting holes **96** adapted to receive the control instruments, a pair of rearwardly or inwardly-directed positioning tabs **98**, and an upwardly-directed locking tab **100**. The positioning tabs **98**, which are located near the lower supporting leg **94**, are provided to properly position the mounting bracket retainer **28** during assembly. The locking tab **100** is provided to extend into the notch **58** provided by the mounting surface **52** of the trim wrapper upper member **32**.

The mounting bracket retainer **28** is generally Z-shaped in cross section, having a lower leg **102** which is adapted to extend into the lower channel **80** provided by the control panel faceplate **24** and an upper leg **104** which is positioned over the mounting bracket **26**, and is in engagement with the main section **90** thereof. A terminal edge **106** of the upper leg **104** is adjacent the positioning tabs **98** provided by the mounting bracket.

The lower leg **102** includes a pair of raised bosses **108** and a notch **110**. The bosses **108** are provided to more snugly fit the lower leg **102** into the lower channel **80**. The lower leg notch **110** is aligned with the notched recess **84** in the lower rail **76** and allows the edge **86** of the rail **76** surrounding the notched recess **84** to receive the tang **62** (FIG. 10). Conventional fasteners attach the retainer **28** to the mounting bracket **26**.

Prior to mounting of the control panel faceplate **24** to the frame defined by the panel trim wrapper **20** and deflector **22**, the mounting bracket **26**, with various control instruments thereon, is attached to the control panel faceplate **24**. While the lower supporting leg **94** is spaced from the main body **64** of the faceplate, the upper supporting leg **92** is slid into the upper channel **78** and a portion of the main section **90** adjacent the upper leg **92** is fit into the notched recess **82** in the upper support rail **74**.

The upper support rail notched recess **82** is sized to receive the mounting bracket **26** and locates or indexes the mounting bracket relative to the faceplate **24** and, more specifically, the control instruments relative to the openings **68** in the main body **64** of the faceplate. The mounting bracket **26** is thereafter pivoted to allow the shafts or stems of the control instruments to extend through the openings **68** in the faceplate **24** and to bring the lower supporting leg **94** into engagement with the faceplate main body **64**.

With the mounting bracket **26** so positioned on the control panel faceplate **24**, the lower leg **102** of the mounting

bracket retainer **28** is slid into the lower channel **80** defined by the lower support rail **76**. The upper leg **104** of the retainer is placed over the mounting bracket, in engagement with the main section **90** thereof, and adjacent to or in engagement with the positioning tabs **98** provided thereby. The raised bosses **108** provided by the retainer **28** cause the lower leg **102** to engage the lower support rail **76** and thereby assist in maintaining the retainer within the lower channel **80**.

The notch **110** in the lower leg of the mounting bracket retainer **28** is longer than the notched recess **84** in the lower support rail **76**, and is located such that it overlaps or is coincident with the lower rail notched recess **84**. As such, the notch **110** extends the length of the lower support rail notched recess **84** and beyond, allowing the tang **62** to engage the edge **86** of the lower support rail **76** surrounding the lower rail notched recess **84** when the faceplate **24** is attached to the frame defined by the trim wrapper **20** and deflector **22**. Conventional fasteners attach the retainer **28** to the mounting bracket **26**.

The faceplate **24**, with the mounting bracket **26** and retainer **28** attached thereto, is removably attached to the trim wrapper **20** and deflector **22** by positioning the faceplate such that the locking tab **100** is received by the tab-receiving notch **58** in the mounting surface **52** of the trim wrapper upper member **32** and the lower support rail **76** is generally spaced from the deflector **22**. The faceplate **24** is thereafter pivoted to bring the lower rail **76** into engagement with the support surface **56** of the deflector **22**, and then slid lengthwise (i.e., to the right in FIGS. 1 and 2) to hook the tang **62** over the edge **86** of the lower support rail **76** surrounding the notched recess **84** (FIG. 10).

With the control panel faceplate so mounted, the attachment surfaces **88** of the lateral mounting ears **66** are in engagement with the mounting surfaces **38** of the side members **34** and the upper and lower support rails **74, 76** are in engagement with the upper member support surface **50** and the deflector support surface **56**, respectively. The locking tab **100** retains the upper portion **70** of the faceplate main body **64** and the tang **62** retains the lower portion **72** of the faceplate main body **64**. Fasteners more securely attach the faceplate mounting ears **66** to the side members **34**. Corner pieces **112** are mounted over forward corners of the control panel **18**, and attached to the side members **34** of the panel trim wrapper **20** with conventional fasteners, to complete assembly thereof.

While the preferred embodiment of the present invention is shown and described herein, it is to be understood that the same is not so limited but shall cover and include any and all modifications thereof which fall within the purview of the invention. For example, it is contemplated that the fasteners used to attach the mounting ears **66** to the side members **34** could be eliminated, and the additional mechanical attachment of the faceplate with the frame or support member being exclusively provided by the corner pieces **112**.

What is claimed is:

1. A method of attaching a control panel faceplate assembly to a control panel frame, comprising the steps of:
  - a. positioning the control panel faceplate assembly such that a tab extending therefrom projects into a notched opening in the frame;
  - b. pivoting the control panel faceplate assembly toward the control panel frame; and,
  - c. lengthwise sliding the control panel faceplate assembly from a position wherein the control panel faceplate may be pivoted away from the control panel frame to a



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position wherein a portion of the control panel faceplate assembly engages an assembly retention means provided by the control panel frame and is thereby prevented from being pivoted away from the control panel frame.

2. A method according to claim 1, wherein the control panel faceplate assembly comprises a faceplate, a mounting bracket, and a mounting bracket retainer.

3. A method according to claim 2, wherein the control panel frame comprises a trim wrapper and deflector, said notched opening being provided by the trim wrapper and the assembly retention means being provided by the deflector.

4. A method according to claim 3, wherein the assembly retention means comprises an outwardly extending tang.

5. A method according to claim 4, comprising the additional step of attaching the control panel faceplate to the control panel frame with a plurality of mechanical fasteners.

6. A method according to claim 1, wherein the assembly retention means comprises an outwardly extending tang.

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7. A method according to claim 6, wherein the control panel faceplate assembly comprises a faceplate, the faceplate defining a notched recess through which the outwardly extending tang extends.

8. A method according to claim 7, wherein the outwardly extending tang engages a surface of the faceplate adjacent the notched recess.

9. A method according to claim 8, wherein the control panel faceplate assembly further comprises a mounting bracket and a mounting bracket retainer.

10. A method according to claim 9, wherein the control panel frame comprises a trim wrapper and deflector, said notched recess being provided by the trim wrapper and the outwardly extending tang being provided by the deflector.

11. A method according to claim 10, comprising the additional step of attaching the control panel faceplate to the control panel frame with a plurality of mechanical fasteners.

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